a₁ concl.

the substrate stage is moved guarantees that a synchronization error between the master stage and the substrate stage falls within an allowable range after the substrate stage is accelerated up to a scan speed for the scanning exposure. The controller controls the movement of the substrate stage such that a setting distance for a first shot region, which is exposed first upon a change in a row to which a shot region to be exposed belongs, is set to be longer than a setting distance for other shot regions. --

IN THE SPECIFICATION:

Please amend the specification as follows:

Please substitute the paragraph beginning at page 1, line 5, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a2

-- The present invention relates to an exposure apparatus and a method for exposing a pattern formed on a master such as a reticle onto a substrate such as a wafer in a photolithography process for manufacturing a semiconductor element, a liquid crystal display element, or the like, and, more particularly, to a scanning exposure method and an apparatus for a step-and-scan scheme in which the master and substrate are synchronously scanned while part of a pattern on the master is projected onto the wafer, so that the pattern of the master is sequentially transferred to the shot regions on the substrate. --

Please substitute the paragraph beginning at page 1, line 27, and ending on page 2, line 7, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

A3

-- In recent years, semiconductor device chips have tended to increase in size, and a pattern having a larger area on a reticle must be exposed onto a wafer. A projection exposure apparatus of a step-and-scan scheme is frequently used because it can expose an area larger than the irradiation field (pattern exposure region in a stationary state) of a projection optical system by synchronously scanning the reticle and wafer. --

Please substitute the paragraph beginning at page 2, line 8, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

A4

-- A cell projection exposure apparatus repeats an operation of stepping the shot region of an exposure object to the irradiation field, an operation of aligning the shot region and reticle, and an exposure operation for the shot region. --

Please substitute the paragraph beginning at page 2, line 24, and ending on page 3, line 12, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

A5

-- Upon completing scanning exposure of one shot, a stepping operation to the next shot in the non-scan direction is started, and at the same time the wafer stage is scanned in the scan direction by a necessary distance in order to set the wafer stage before the start of scanning

A5 concl.

exposure. The wafer stage is then decelerated. Upon completing scanning in the scan direction, the scan direction is reversed, and then scanning exposure of the next shot is started. The series of operations described above are repeated. The setting distance necessary before the start of scanning exposure is obtained by the product of the scan speed and the time (setting time) required until the vibration generated upon accelerating the wafer stage falls within the allowable range in which the vibration does not interfere with exposure. --

Please substitute the paragraph beginning at page 4, line 20, and ending on page 5, line 13, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

A6

-- According the present invention, the foregoing object is attained by providing a scanning exposure apparatus for transferring a pattern of a master onto each shot region while synchronously scanning the master and a substrate on which a plurality of shot regions are arrayed, the apparatus comprising: a master stage for moving the master; a substrate stage for moving the substrate; and a controller for controlling movement of the substrate stage over a plurality of shot regions so as to assure a setting distance serving as a distance for scanning and moving the substrate stage at a uniform velocity in order to guarantee that a synchronization error between the master stage and the substrate stage falls within an allowable range after the substrate stage is accelerated up to a scan speed for scanning exposure, wherein the controller controls the movement of the substrate stage such that a setting distance for a first shot region to

A6 concl.

be scanned and exposed upon a change in row to which a shot region of an exposure object belongs is set to be longer than a setting distance for other shot regions. --

Please substitute the paragraph beginning at page 5, line 24, and ending on page 6, line 2, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

A7

-- In a preferred embodiment, the setting distance is determined on the basis of a setting time until a synchronization error between the master stage and the substrate stage falls within an allowable range after the substrate stage is accelerated up to a scan speed for scanning exposure. --

Please substitute the paragraph beginning at page 6, line 3, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

A8

-- According to another aspect of the present invention, the foregoing object is attained by providing a scanning exposure apparatus for transferring a pattern of a master onto each shot region while synchronously scanning the master and a substrate on which a plurality of shot regions are arrayed, the apparatus comprising: a master stage for moving the master; a substrate stage for moving the substrate; and a controller for controlling movement of the substrate stage for a plurality of shot regions so as to assure a setting distance serving as a distance for scanning and moving the substrate stage at a uniform velocity in order to guarantee that a synchronization error between the master stage and the substrate stage falls within an allowable range after the

a_8 concl.

substrate stage is accelerated up to a scan speed for scanning exposure, wherein the controller controls movement of the substrate stage in accordance with a setting distance determined for each row to which a plurality of shot regions belongs. --

Please substitute the paragraph beginning at page 6, line 23, and ending on page 7, line 1, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a_9

-- In a preferred embodiment, the setting distance is determined on the basis of a setting time until a synchronization error between the master stage and the substrate stage falls within an allowable range after the substrate stage is accelerated up to a scan speed for scanning exposure. --

Please substitute the paragraph beginning at page 7, line 24, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a_{10}

-- According to another aspect of the present invention, the foregoing object is attained by providing a scanning exposure method of transferring a pattern of a master onto each shot region while synchronously scanning the master and a substrate on which a plurality of shot regions are arrayed, the method comprising: the control step of controlling movement of a substrate stage for a plurality of shot regions so as to assure a setting distance serving as a distance for scanning and moving the substrate stage at a uniform velocity in order to guarantee that a synchronization error between a master stage and the substrate stage falls within an allowable range after the

A10 Concl

substrate stage is accelerated up to a scan speed for scanning exposure, wherein in the control step, the movement of the substrate stage is controlled such that a setting distance for a first shot region to be scanned and exposed upon a change in row to which a shot region of an exposure object belongs is set to be longer than a setting distance for other shot regions. --

Please substitute the paragraph beginning at page 8, line 1, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

A11

-- In a preferred embodiment, in the control step, the continuous movement of the substrate stage is controlled in accordance with a setting distance determined for each row to which a plurality of shot regions belongs. --

Please substitute the paragraph beginning at page 8, line 6, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

A12

-- In a preferred embodiment, the setting distance is determined on the basis of a setting time until a synchronization error between the master stage and the substrate stage falls within an allowable range after the substrate stage is accelerated up to a scan speed for scanning exposure. --

Please substitute the paragraph beginning at page 8, line 12, and ending on page 9, line 2, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a13

-- According to another aspect of the present invention, the foregoing object is attained by providing a scanning exposure method of transferring a pattern of a master onto each shot region while synchronously scanning the master and a substrate on which a plurality of shot regions are arrayed, the method comprising: the control step of controlling movement of a substrate stage for a plurality of shot regions so as to assure a setting distance serving as a distance for scanning and moving the substrate stage at a uniform velocity in order to guarantee that a synchronization error between a master stage and the substrate stage falls within an allowable range after the substrate stage is accelerated up to a scan speed for scanning exposure, wherein in the control step, movement of the substrate stage is controlled in accordance with a setting distance determined for each row to which a plurality of shot regions belongs. --

Please substitute the paragraph beginning at page 9, line 3, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a14

-- In a preferred embodiment, the setting distance is determined on the basis of a setting time until a synchronization error between the master stage and the substrate stage falls within an allowable range after the substrate stage is accelerated up to a scan speed for scanning exposure. --

Please substitute the paragraph beginning at page 9, line 9, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a15

-- According to another aspect of the present invention, the foregoing object is attained by providing a semiconductor device manufacturing method comprising the steps of: installing manufacturing apparatuses, for performing various processes, including the above scanning exposure apparatus in a semiconductor manufacturing factory, and manufacturing a semiconductor device in a plurality of processes by using the manufacturing apparatuses. --

Please substitute the paragraph beginning at page 9, line 18, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a16

-- According the preferred embodiment of the present invention, the method may comprise the steps of: connecting the manufacturing apparatuses by a local area network; and communicating information about at least one of the manufacturing apparatuses between the local area network and an external network of the semiconductor manufacturing factory. --

Please substitute the paragraph beginning at page 9, line 25, and ending on page 10, line 3, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a17

-- According to the preferred embodiment of the present invention, the method may comprise the step of acquiring maintenance information of the scanning exposure apparatus by accessing a database provided by a vendor or user of the scanning exposure apparatus via the external network. --

Please substitute the paragraph beginning at page 10, line 4, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a18

-- According to another aspect of the present invention, the foregoing object is attained by providing a semiconductor manufacturing factory comprising: manufacturing apparatuses for performing various processes including the above scanning exposure apparatus; a local area network for connecting the manufacturing apparatuses; and a gateway for allowing the local area network to access an external network of the factory, wherein information about at least one of the manufacturing apparatuses is communicated. --

Please substitute the paragraph beginning at page 10, line 14, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a19

-- According to another aspect of the present invention, the foregoing object is attained by providing a maintenance method for the above scanning exposure apparatus that is installed in a semiconductor manufacturing factory, the method comprising the steps of: causing a vendor or user of the scanning exposure apparatus to provide a maintenance database connected to an external network of the semiconductor manufacturing factory; authenticating access from the semiconductor manufacturing factory to the maintenance database via the external network; and transmitting maintenance information accumulated in the maintenance database to the semiconductor manufacturing factory via the external network. --

Please substitute the paragraph beginning at page 11, line 1, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

A20

-- According to the preferred embodiment of the present invention, the apparatus may comprise: a display, a network interface and a computer for executing network software, wherein maintenance information of the scanning exposure apparatus can be communicated via a computer network. --

Please substitute the paragraph beginning at page 11, line 14, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

A21

-- According to the present invention, the foregoing object is attained by providing a semiconductor device manufacturing method comprising the steps of: installing manufacturing apparatuses, for performing various processes, including the above scanning exposure apparatus, in a semiconductor manufacturing factory; and manufacturing a semiconductor device in a plurality of processes by using the manufacturing apparatuses. --

Please substitute the paragraph beginning at page 11, line 22, and ending on page 12, line 1, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

A22

-- According to the preferred embodiment of the present invention, the method may comprise the steps of: connecting the manufacturing apparatuses by a local area network; and

a22 concl.

communicating information about at least one of the manufacturing apparatuses between the local area network and an external network of the semiconductor manufacturing factory. --

Please substitute the paragraph beginning at page 12, line 12, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a23

-- According to the preferred embodiment of the present invention, the method may comprise the step of acquiring maintenance information of the scanning exposure apparatus by accessing a database provided by a vendor or user of the scanning exposure apparatus via the external network. --

Please substitute the paragraph beginning at page 12, line 8, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a24

-- According to another aspect of the present invention, the foregoing object is attained by providing a semiconductor manufacturing factory comprising: manufacturing apparatuses, for performing various processes, including the above scanning exposure apparatus; a local area network for connecting the manufacturing apparatuses; and a gateway for allowing the local area network to access an external network of the factory, wherein information about at least one of the manufacturing apparatuses is communicated. --

Please substitute the paragraph beginning at page 12, line 18, and ending on page 13, line 4, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a25

-- According to another aspect of the present invention, the foregoing object is attained by providing a maintenance method for the above scanning exposure apparatus that is installed in a semiconductor manufacturing factory, the method comprising the steps of: causing a vendor or user of the scanning exposure apparatus to provide a maintenance database connected to an external network of the semiconductor manufacturing factory; authenticating access from the semiconductor manufacturing factory to the maintenance database via the external network; and transmitting maintenance information accumulated in the maintenance database to the semiconductor manufacturing factory via the external network. --

Please substitute the paragraph beginning at page 13, line 5, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a26

-- According to the preferred embodiment of the present invention, the apparatus may comprise: a display; a network interface; and a computer for executing network software, wherein maintenance information of the scanning exposure apparatus can be communicated via a computer network. --

Please substitute the paragraph beginning at page 14, line 13, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a27 -- Fig. 4 is a plan view for explaining a method of adapting a synchronization setting distance in a change in a row of shots; --

Please substitute the paragraph beginning at page 15, line 14, and ending on page 16, line 4, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a28 -- Fig. 1 shows the schematic arrangement of the projection exposure apparatus according to this embodiment. Referring to Fig. 1, illumination light IL emitted from an illumination optical system SL including a light source, a variable field stop for shaping the illumination light into a slit, and a condenser lens illuminates a slit-like illumination region on a reticle R with a uniform illuminance profile. A pattern on the reticle R within the illumination region is inverted and reduced at a projection magnification α (e.g., $\alpha = 1/4$) through a projection optical system UL. The resultant image is projected and exposed onto a slit-like irradiation field on a wafer W. Examples of the illumination light IL are a KrF excimer laser beam, an ArF excimer laser beam, and the bright lines (e.g., g- and i-lines) of the ultraviolet range of an ultra-high-pressure mercury lamp. --

Please substitute the paragraph beginning at page 16, line 5, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a29 -- The reticle R is placed on a reticle stage 7. The reticle stage 7 finely and two-dimensionally moves the reticle R in a plane perpendicular to the optical axis of the projection

a29 concl.

optical system UL, thereby positioning the reticle R. At the same time, the reticle stage 7 scans the reticle R in synchronism with a wafer stage 1. The reticle stage 7 has a scan-direction stroke long enough to make the entire surface of the pattern region of the reticle R cross at least the slit-like illumination region. A mirror 8 for reflecting a laser beam emitted from a laser interferometer 28 is fixed at the end portion of the reticle stage 7. The position of the reticle stage 7 is always monitored by the laser interferometer 28. The position information of the reticle stage 7 from the laser interferometer 28 is supplied to a controller 21. The controller 21 controls the position and speed of the reticle stage 7 through a reticle stage driver 26 on the basis of the position information. --

Please substitute the paragraph beginning at page 16, line 24, and ending on page 17, line 9, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a30

-- The wafer W is placed on the chuck of the wafer stage 1. The wafer stage 1 performs a step-and-scan operation of repeating a stepping operation to each shot region on the wafer W and a scan operation. The controller 21 controls the wafer stage 1 to move the wafer in a vertical direction (Z direction) and tilt direction. A mirror 3 for reflecting a laser beam emitted from a laser interferometer 27 is mounted at the end portion of the wafer stage 1. The position of the wafer stage 1 is always monitored by the laser interferometer 27. The controller 21 controls the position and speed of the wafer stage 1 as in the control for the reticle stage 27. --

Please substitute the paragraph beginning at page 17, line 17, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a31

-- First of all, the setting of drive target values of the wafer stage 1 and reticle stage 7 will be described below. The laser interferometer 27 detects the position of the wafer stage 1 by using the mirror 3. The wafer stage 1 is driven in the X direction, Y direction, and rotational direction (θ direction) on the basis of the detected position. Since a triaxial laser source is mounted in the laser interferometer 27, drive amounts in the θ and tilt directions can also be detected. The laser interferometer 27 detects position information for every predetermined time interval and supplies the position information to the controller 21 which systematically controls the operation of the entire apparatus. The controller 21 outputs a drive instruction to the wafer stage driver 25 for every predetermined time interval on the basis of the position information, thereby driving the wafer stage 1 to the target position. --

Please substitute the paragraph beginning at page 20, line 15, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a32

-- In exposure for adjacent shots, the wafer stage 1 is moved at a uniform velocity by a distance required for setting at the end of exposure. The wafer stage 1 can be moved beforehand by the setting distance required before the start of exposure of the next shot. Exposure can be done without interrupting scanning in a moving operation between the shots. The setting distance L2 is calculated as the product ($L2 = Vw \times Tw$) of the exposure speed Vw and the setting time Tw of the wafer stage. At present, since the setting time Tw is always constant

a32 conc. regardless of conditions, a time required for moving the wafer stage 1 by the distance L2 is constant regardless of the exposure speed. --

Please substitute the paragraph beginning at page 21, line 21, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a33 -- The controller 21 has an arithmetic unit 23 for calculating the difference ΔYR between the target value ($YRN - \Delta YW/\alpha$) and the coordinate position YR of the stage 7 supplied from the laser interferometer 28:

$$\Delta YR = YRN - \Delta YW/\alpha - YR. \text{ --}$$

Please substitute the paragraph beginning at page 21, line 26, and ending on page 22, line 3, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a34 -- This difference ΔYR is the positional offset of the reticle stage 7 with respect to the target position of the reticle stage 7 corresponding to the actual position of the wafer stage 1. That is, the difference ΔYR is the synchronization error in the scan direction. --

Please substitute the paragraph beginning at page 22, line 4, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a35 -- In obtaining the setting time required for setting the wafer stage 1, the arithmetic unit 23 must calculate and monitor synchronization error ΔYR for every predetermined time interval

a35 concl.

on the basis of the outputs from the laser interferometers 27 and 28. A method of determining the setting time based on the synchronization error ΔYR will be described with reference to Fig. 3. --

Please substitute the paragraph beginning at page 22, line 12, and ending on page 23, line 4, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a36

-- Fig. 3 shows a change in synchronization error ΔYR from the instant when acceleration of the wafer stage 1 is complete. More specifically, Fig. 3 shows a change in synchronization error ΔYR as a function of time when the wafer stage 1 is moved at a uniform velocity. The synchronization error ΔYR decreases to converge the vibration with the elapse of time T. The synchronization setting time is obtained as follows. The laser interferometers 27 and 28 and the synchronization error arithmetic unit 23 measure the synchronization error ΔYR for every predetermined time interval at the end of acceleration of the wafer stage 1 and determine the time until the absolute value of the synchronization error ΔYR falls within an allowable range ε. In Fig. 3, TA is the synchronization setting time. The allowable value ε is determined by performance of the apparatus and hardware factors. In this case, the synchronization setting distance is a distance obtained by multiplying the synchronization setting time by the scan speed. --

Please substitute the paragraph beginning at page 23, line 5, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a37 -- The exposure procedures for a plurality of shots arrayed in a matrix on the wafer according to a preferred embodiment of the present invention will be described with reference to Fig. 4. Fig. 4 is a view when paying attention to a change in a row of exposure objects as a plurality of shots in exposure according to the step-and-scan scheme. --

Please substitute the paragraph beginning at page 23, line 12, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a38 -- Fig. 4 shows a state wherein exposure is performed by setting the synchronization setting distance of the first shot to be scanned and exposed upon a change in a row to be longer than the synchronization setting distance of the remaining shots upon a change in a row of the exposure objects. A distance D in Fig. 4 is a distance by which the wafer stage 1 is accelerated until it reaches the exposure scan speed. Distances $L1$ and $L1'$ ($L1 < L1'$) represent the synchronization setting distances until the synchronization error ΔYR falls within the allowable range ε upon accelerating the wafer stage 1 up to the scan speed. $L1$ is the synchronization setting distance without any change in row, while $L1'$ is the synchronization setting distance of the first shot upon a change in a row. --

Please substitute the paragraph beginning at page 24, line 1, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a 39

-- The stepping amount of the wafer stage 1 upon a change in the row is larger than that without any change in the row. The vibration of the wafer stage 1 upon acceleration is larger than that generated by exposing parallel shots (shots having the same Y-coordinate, i.e., shots arrayed in a direction perpendicular to the scan direction in scanning exposure) without any change in the row. As a result, when the first shot scanned and exposed upon a change in the row is to be exposed, a longer synchronization setting distance than the synchronization setting distance required for exposing parallel shots without any change in the row is required. In the current exposure apparatus, since the same setting distance is designated for all the shots, the distance for properly setting the wafer stage 1 for all the shots, i.e., a value as the sum of the margin and the longest setting distance required for a change in the row is used. --

Please substitute the paragraph beginning at page 24, line 19, and ending on page 25, line 21, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a 40

-- In the scanning exposure method of the preferred embodiment of the present invention, to reduce an unnecessary synchronization setting distance, L1 is used as the setting distance for the parallel shots without any change in the row, such as shots S1 and S2. For the first shot S3 to be scanned and exposed upon a change in the row, the setting distance is switched to a longer setting distance L1′ than the synchronization setting distance required for the shots S1 and S2, thereby starting the exposure. The synchronization setting distances L1 and L1′ are obtained as follows. The controller 21 loads the synchronization setting times about parallel shots without

any change in the row and the first shot to be scanned and exposed upon a change in the row. The controller 21 multiplies the scan speed in exposure with the loaded synchronization setting times. Each synchronization setting time stored in a storage unit 24 can be obtained by measuring a synchronization setting time a plurality of number of times beforehand and adding a variance to the average value of the measured values. The synchronization setting time increases in proportion to the scan speed (scanning exposure speed) in exposure. For this reason, the synchronization setting times are measured at, e.g., 100 mm/sec, 150 mm/sec, 200 mm/sec, and 250 mm/sec. Scanning exposure at the actual scanning exposure speed of 160 mm/sec is performed using the synchronization setting time measured at 200 mm/sec, thereby performing exposure with an optimized synchronization setting distance. --

A40 concl

Please substitute the paragraph beginning at page 25, line 22, and ending on page 26, line 9, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

A41

-- Fig. 5 is a view showing a wafer layout. The thrust of a linear motor serving as a driving source for the wafer stage 1 is nonuniform depending on positions, and a reaction force of a damper which supports the wafer stage surface plate changes depending on the position on the wafer stage 1. The synchronization setting time changes depending on the driving coordinates. For this reason, when the synchronization setting time is strictly measured, the measured synchronization setting time changes depending on the shots, in Fig. 5. For this reason, there can be a method of performing exposure by measuring the synchronization setting

A41 time for each shot on the layout in Fig. 5 and switching the synchronization setting distance for concl each shot in scanning exposure. --

Please substitute the paragraph beginning at page 27, line 26, and ending on page 28, line 18, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

A42 -- To measure synchronization accuracy, for example, the scan speed and scan acceleration are changed for every predetermined time interval, and the synchronization setting times measured under the respective conditions are held as a table in the storage unit 24 or the like in Fig. 1. In scanning exposure, the controller 21 obtains an optimal synchronization time in the table in accordance with the scan speed. If no optimal synchronization setting time corresponding to the scan speed is present in the table, a synchronization setting time can be calculated by linear interpolation using two approximate values in the table. Using the resultant setting time, the setting distance is obtained by the product of the setting time and scan speed. If the synchronization setting time is based on the scan acceleration, the setting distance is calculated by the product of the scan speed obtained by integrating the scan acceleration and the setting time based on the above setting time measurement result corresponding to the change in scan acceleration. --

Please substitute the paragraph beginning at page 30, line 24, and ending on page 31, line 5, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a43

-- A production system for producing a semiconductor device (e.g., a semiconductor chip such as an IC or LSI, liquid crystal panel, CCD, thin-film magnetic head, micromachine, or the like) will be exemplified. A trouble remedy or periodic maintenance of a manufacturing apparatus installed in a semiconductor manufacturing factory, or maintenance service such as software distribution is performed by using a computer network outside the manufacturing factory. --

Please substitute the paragraph beginning at page 31, line 6, and ending on page 32, line 2, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a24

-- Fig. 6 shows the overall system cut out at a given angle. In Fig. 6, reference numeral 101 denotes a business office of a vendor (apparatus supply manufacturer) which provides a semiconductor device manufacturing apparatus. Assumed examples of the manufacturing apparatus are semiconductor manufacturing apparatuses for performing various processes used in a semiconductor manufacturing factory, such as pre-process apparatuses (lithography apparatus including an exposure apparatus, a resist processing apparatus, and an etching apparatus, an annealing apparatus, a film formation apparatus, a planarization apparatus, and the like) and post-process apparatuses (e.g., an assembly apparatus, an inspection apparatus, and the like). The

business office 101 comprises a host management system 108 for providing a maintenance database for the manufacturing apparatus, a plurality of operation terminal computers 110, and a LAN (Local Area Network) 109 which connects the host management system 108 and computers 110 to construct an intranet. The host management system 108 has a gateway for connecting the LAN 109 to Internet 105 as an external network of the business office, and a security function for limiting external accesses. --

A44 Concl.

Please substitute the paragraph beginning at page 33, line 17, and ending on page 34, line 16, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

A45

-- Fig. 7 is a view showing the concept of the overall system of this embodiment that is cut out at a different angle from Fig. 6. In the above example, a plurality of user factories having manufacturing apparatuses and the management system of the manufacturing apparatus vendor are connected via an external network, and production management of each factory or information of at least one manufacturing apparatus is communicated via the external network. In the example of Fig. 7, a factory having manufacturing apparatuses of a plurality of vendors, and the management systems of the vendors for these manufacturing apparatuses are connected via the external network of the factory, and maintenance information of each manufacturing apparatus is communicated. In Fig. 7, reference numeral 201 denotes a manufacturing factory of a manufacturing apparatus user (semiconductor device manufacturer) where manufacturing apparatuses for performing various processes, e.g., an exposure apparatus 202, a resist processing

apparatus 203, and a film formation apparatus 204 are installed in the manufacturing line of the factory. Fig. 7 shows only one manufacturing factory 201, but a plurality of factories are networked in practice. The respective apparatuses in the factory are connected to a LAN 206 to construct an intranet, and a host management system 205 manages the operation of the manufacturing line. --

a45 concl

Please substitute the paragraph beginning at page 34, line 17, and ending on page 35, line 10, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a46

-- The business office of vendors (apparatus supply manufacturers) such as an exposure apparatus manufacturer 210, a resist processing apparatus manufacturer 220, and a film formation apparatus manufacturer 230 comprise host management systems 211, 221, and 231 for executing remote maintenance for the supplied apparatuses. Each host management system has a maintenance database and a gateway for an external network, as described above. The host management system 205 for managing the apparatuses in the manufacturing factory of the user, and the management systems 211, 221, and 231 of the vendors for the respective apparatuses are connected via the Internet 200 or dedicated-line network serving as an external network 200. If a trouble occurs in any one of a series of manufacturing apparatuses along the manufacturing line in this system, the operation of the manufacturing line in this system, the operation of the manufacturing line stops. This trouble can be quickly solved by remote maintenance, from the

a46 concl.

vendor of the apparatus in trouble, via the Internet 200. This can minimize the stoppage of the manufacturing line. --

Please substitute the paragraph beginning at page 35, line 11, and ending on page 36, line 16, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

a47

-- Each manufacturing apparatus in the semiconductor manufacturing factory comprises a display, a network interface, and a computer for executing network access software and apparatus operating software which are stored in a storage device. The storage device is a built-in memory, hard disk, or network file server. The network access software includes a dedicated or general-purpose web browser, and provides a user interface having a window as shown in Fig. 8 on the display. While referring to this window, the operator who manages manufacturing apparatuses in each factory inputs, in input items on the windows, pieces of information such as a type 401 of manufacturing apparatus, a serial number 402, a subject 403 of trouble, an occurrence date 404, a degree 405 of urgency, a symptom 406, a remedy 407, and a progress 408. The pieces of input information are transmitted to the maintenance database via the Internet, and appropriate maintenance information is sent back from the maintenance database and displayed on the display. The user interface provided by the web browser realizes hyperlink functions 410 to 412, as shown in Fig. 8. This allows the operator to access detailed information of each item, receive the latest-version software to be used for a manufacturing apparatus from a software library provided by a vendor, and receive an operation guide (help information) as a reference for the

A17 cont.

operator in the factory. Maintenance information provided by the maintenance database includes maintenance information concerning the present invention described above. The software library also provides the latest-version software for realizing the present invention. --

Please substitute the paragraph beginning at page 37, line 18, and ending on page 38, line 12, with the following. A marked-up copy of this paragraph, showing the changes made thereto, is attached in Appendix A.

A18

-- Fig. 10 shows the detailed flow of the wafer process. In step 11 (oxidation), the wafer surface is oxidized. In step 12 (CVD), an insulating film is formed on the wafer surface. In step 13 (electrode formation), an electrode is formed on the wafer by vapor deposition. In step 14 (ion implantation), ions are implanted in the wafer. In step 15 (resist processing), a photosensitive agent is applied to the wafer. In step 16 (exposure), the above-mentioned scanning exposure apparatus bakes and exposes the circuit pattern of a mask on the wafer. In step 17 (developing), the exposed wafer is developed. In step 18 (etching), the resist is etched except for the developed resist image. In step 19 (resist removal), an unnecessary resist after etching is removed. These steps are repeated to form multiple circuit patterns on the wafer. A manufacturing apparatus used in each step undergoes maintenance by the remote maintenance system, which prevents trouble in advance. Even if trouble occurs, the manufacturing apparatus can be quickly recovered. The productivity of the semiconductor device can be increased in comparison with the prior art. --